

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (currently amended) A composite structure, comprising:
a first layer of material;
a second layer of material;
a resin layer disposed between said first and second layers of material for bonding said layers together to form a unitary structure; [and]
a plurality of shape memory alloy (SMA) particles dispersed throughout at least a portion of said resin layer for toughening said unitary structure[.]; and
wherein said SMA particles are provided in an austenitic state.
2. (original) The composite structure of claim 1, wherein said SMA particles comprise Nitinol® alloy particles.
3. (original) The composite structure of claim 1, wherein said SMA particles comprise cylindrical shaped SMA particles.
4. (original) The composite structure of claim 1, wherein said SMA particles comprise oval shaped SMA particles.

5. (original) The composite structure of claim 1, wherein said SMA particles comprise generally spherical shaped SMA particles.

6. (original) The composite structure of claim 1, wherein said SMA particles comprise a cross-sectional diameter no greater than approximately 50 microns.

7. (cancelled) The composite structure of claim 1, wherein said SMA particles comprise SMA particles in an austenitic phase.

8. (cancelled) The composite structure of claim 1, wherein said SMA particles comprise SMA particles in a martensitic phase.

9. (currently amended) A composite structure, comprising:
a first fibrous layer;
a second fibrous layer;
a resin matrix compound disposed between said first and second layers of material for bonding said layers together to form a unitary structure; and
a plurality of metal particles dispersed throughout at least a portion of said resin matrix layer, said particles comprising a reversible, super elastic strain property for toughening said unitary structure without negatively affecting a hot-wet compression strength of said resin matrix compound[.]; and
wherein said metal particles are provided in an austenitic phase.

10. (original) The composite structure of claim 9, wherein said metal particles comprise Nitinol® alloy particles.

11. (original) The composite structure of claim 10, wherein said metal particles comprise one of:

oval shaped particles;

spherical shaped particles; and

cylindrical shaped particles.

12. (original) The composite structure of claim 11, wherein said metal particles comprise a cross sectional diameter no greater than approximately 50 microns.

13. (currently amended) A resin matrix for bonding a pair of material layers to one another to form a composite structure having increased damage resistance and damage tolerance (e.g. compression-after-impact (CAI) strength), said resin matrix comprising:

a resin material; and

a plurality of shape memory alloy (SMA) particles in an austenitic phase and being dispersed throughout said resin material to toughen said resin matrix.

14. (original) The resin matrix of claim 1, wherein said SMA particles comprise Nitinol® alloy particles.

15. (original) The resin matrix of claim 1, wherein said SMA particles comprise one of a cylindrical shape, a spherical shape and an oval shape.

16. (original) The resin matrix of claim 1, wherein said SMA particles comprise a cross-sectional diameter of no greater than about 50 microns.

17. (cancelled) The resin matrix of claim 1, wherein said SMA particles comprise SMA particles in an austenitic phase.

18. (cancelled) The resin matrix of claim 1, wherein said SMA particles comprise SMA particles in a martensitic phase.

19. (currently amended) A method for forming a composite structure comprising:

a) providing a first fiber layer;

b) providing a second fiber layer; and

c) placing a layer of resin matrix to a surface of one of said fiber layers and urging the other one of said fiber layers into contact with said resin matrix, said resin matrix including a plurality of shape memory alloy (SMA) particles in an austenitic phase dispersed within a resin of said resin matrix to toughen said resin matrix, and therefore of said composite structure; and

d) heating said fiber layers and said resin matrix to cure said resin matrix, to thereby cause said fiber layers and said resin matrix to form a unitary, composite structure.

20. (original) The method of claim 19, wherein step c) comprises using SMA particles comprised of Nitinol® alloy.

21. (original) The method of claim 19, wherein step c) comprises using SMA particles having a cross-sectional diameter of no more than about 50 microns.

22. (original) The method of claim 19, wherein step c) comprise using SMA particles shaped in one of: a cylinder, a sphere and an oval.

23. (original) The method of claim 19, wherein step c) comprise using SMA particles having a cross-sectional diameter of between about 50 microns and about 0.005 micron.